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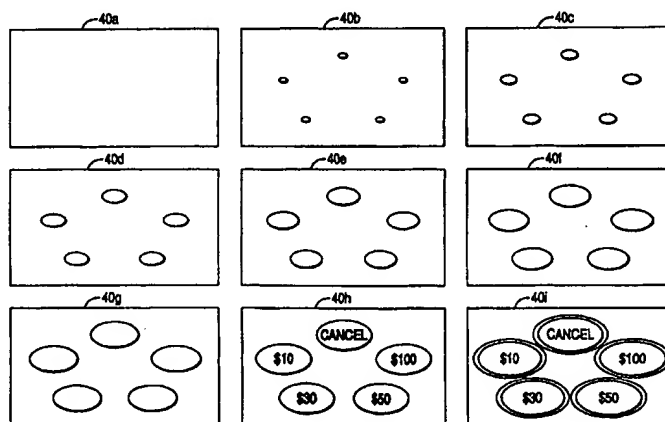
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(21) International Application Number: PCT/GB99/03685 (22) International Filing Date: 8 November 1999 (08.11.99) (30) Priority Data: 9824763.8 11 November 1998 (11.11.98) GB (71) Applicant (for all designated States except US): NCR INTERNATIONAL, INC. [US/US]; 1700 South Patterson Boulevard, Dayton, OH 45479 (US). (72) Inventor; and (75) Inventor/Applicant (for US only): HOLMES, Anthony [GB/GB]; 14 Bank Avenue, Dundee DD3 8NY (GB). (74) Agent: WILLIAMSON, Brian; NCR Limited, International Patent Department, 206 Marylebone Road, London NW1 6LY (GB).		(81) Designated States: BR, CN, JP, US, ZA, European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE). Published With international search report.	

(54) Title: METHOD AND APPARATUS FOR SHOWING USER SELECTABLE OPTIONS ON THE DISPLAY SCREEN OF A DATA PROCESSING APPARATUS



(57) Abstract

The present invention relates to a method and apparatus for showing user selectable options on the display screen of a data processing apparatus. The data processing apparatus includes a data processor, a display device incorporating a display screen, a display device driver, user entry means such as a mouse, keyboard or touch screen entry, and programming means to control the data processing apparatus. The programming is adapted to operate the display device driver to depict a control object or icon defining a data processing operation. The entry means is operable by the user to cause the system to perform the operation defined by the control object. The depiction of the control object comprises forward and reverse successions of images in which the amount of picture detail of the depiction is increased progressively through the succession of images and subsequently reduced progressively. The control object is thus made to appear to grow on the screen and subsequently to shrink from the screen.

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Method and apparatus for showing user selectable options on the display screen of a data processing apparatus.

Data processing apparatus in general use employs a data
5 processor, a display device incorporating a display
screen and a display driver to present images on the
display screen. Such a general configuration of data
processing apparatus is to be found in a wide variety of
environments and is used for personal computers, self-
10 service terminals, automated teller machines and the
like. In many applications of such data processing
apparatus the user is confronted by images on the screen
which allow the user to choose from a succession of menus
of options. Each menu will allow the user to select one
15 or more options so as to cause the apparatus to perform
the selected process or processes. The selection of an
option may be made in a variety of ways including
selection by a mouse, by keyboard or by touching the
screen so as to select an icon representing the option.

20

The images which are presented to the user should give a
clearly recognisable indication of the options that are
being made available. In machines such as self-service
terminals or automated teller machines used by the
25 general public, the manner in which attention is drawn to
the individual icons in the menu becomes important. The
screen background, layout and design of individual icons
all contribute to ease of use of the machine.

30 It is the aim of the present invention to provide an
improvement in the operation of a display screen included

in data processing apparatus to show different data processing options to the user.

According to the present invention, there is provided a
5 method of operating a data processing system including a
data processor, a display device incorporating a display
screen, a display device driver, user entry means and
programming means to control the data processing
10 apparatus, the method comprising operating the display
device driver to depict a control object defining a data
processing operation, and controlling the system through
the user entry means to perform the operation defined by
the control object, the depiction of the control object
comprising a forward succession of images in which the
15 amount of picture detail of the depiction is increased
progressively through the succession of images.

Further, according to the present invention, there is
provided data processing apparatus including a data
20 processor, a display device incorporating a display
screen, a display device driver, user entry means and
programming means to control the data processing
apparatus, the programming means being adapted to operate
the display device driver to depict a control object
25 defining a data processing operation, the entry means
being operable by the user to cause the system to perform
the operation defined by the control object, the
depiction of the control object comprising a succession
of images in which the amount of picture detail of the
30 depiction is increased progressively through the
succession of images.

The invention will now be described, by way of example,
with reference to the accompanying drawings in which;

Figure 1 shows a data processing system embodying the
5 present invention,

Figure 2 is a diagram of programming for the system of
Figure 1,

10 Figure 3 is a flow diagram of steps used in the operation
of the system of Figure 1, and

Figure 4 shows a progression of images produced on a
display screen incorporated in the system of Figure 1.

15

In Figure 1, a central processor 10 incorporates a read-
only memory 10a. The central data processor is connected
to a data bus 11. A display device 12, a user interface
13, a random access memory 14 and a communications
20 interface 15 are also connected to the data bus 11. The
data processor 10 is programmed by an operating system
accessible from the random access memory 14 and supplied
to the ROM 10a by way of the data bus 11 in a manner
which is generally well known in the art. The programming
25 of the data processor includes drivers which enable the
data processor to communicate with the display device 12,
the user interface 13 and the communications interface 15
over the data bus 11.

30 The display device 12 is a cathode ray tube monitor
although the invention may be practised with any suitable
display device, including liquid crystal display devices,

which are capable of providing the user with a display to monitor the operation of the apparatus. In the preferred embodiment of the invention, the display device 12 is a touch screen display device which enables the user to make selections from menus of options displayed by the display device. Such touch screen display devices are well known in the data processing art.

The user interface 13, which includes a keyboard and mouse capable of operating a cursor displayed on the display, provide an additional means enabling the user to make selections from menus of options displayed by the display device. Other user interface options for practising the invention include voice actuated entry means enabling the user to make entries to the data processing means and speaker outputs providing the data processing means with the ability to communicate requests for information to the user.

The communications interface 15 includes a modem or other electronic communication device for electronically communicating data into the data processing apparatus or communicating data from the data processing apparatus.

Referring to Figure 2, it will be seen that the programming of the data processing apparatus of Figure 1 includes an operating system to control the basic operation of the apparatus together with drivers to operate the peripheral devices including the display device 12, the user interface 13 and the communications interface 15. One or more application programs are provided to perform the tasks required of the data

processing system. The application programs include menu driven applications in which the user is presented on the display screen 12 with control objects or icons. Each control object or icon represents a choice which the user
5 can make from the menu. In response to the selection by the user of one or more control objects or icons, the application program responds to the selection, completes the requested data processing step and moves to the next menu.

10

In a specific embodiment of the invention, the data processing system constitutes an automated teller machine at which the user can conduct financial transactions such as cash withdrawal. One menu displayed on the screen of
15 the display device 12 includes control objects or icons representing choices to be made regarding whether the user wishes to withdraw cash or undertake alternative financial transactions. Another menu displayed on the screen of the display device 12 includes control objects
20 or icons representing different amounts which can be selected for withdrawal. One such control object or icon is shown in Figure 4.

Figure 4 shows an individual control object or icon the
25 picture detail of which changes progressively. In a first image 40a, no picture detail of the icon is presented. In successive images from the first image 40a through successive intermediate images 40b, 40c, 40d, 40e, 40f, 40g, 40h up to the final image 40i, the amount of picture
30 detail increases progressively. The switch from the first image 40a to the final image 40i is effected progressively by stepping through the succession of

intermediate images 40b - 40h in which the amount of picture detail of selectable options is changed progressively.

5 The control object or icon shown in Figure 4 could be the sole control object or icon displayed on the screen. Such an icon may represent a request to enter a PIN number into an automated teller machine. More usually, however, the control object or icon will constitute one of a
10 number or group of different such icons each of which represents a different user selectable option in a menu of options. A background picture or image is displayed on the screen under the control of the application program and the progression of images of the control objects or
15 icons is superimposed on the background image. By this means, each control object or icon is made to appear to the user as an animation in which the picture detail of the object or icon grows on the background image on the display screen instead of appearing instantaneously. The
20 time period over which the object or icon appears to grow on the screen is a matter of design choice and depends on the capacity of the system to generate the data required to form the intermediate images in the animation. A suitable time scale includes a period of from 2 seconds
25 to 10 seconds. The number of intermediate images relating to the same control object or icon, in the preferred embodiment, would make the animation appear to the human eye to be a continuously changing image without perceptible discontinuities. It is however within the
30 contemplation of the invention that the number and timing of intermediate images represents a progression in which

some discontinuity between successive images can be observed.

It is to be noted that the animation is not a mere
5 increase in the size of the control object or icon. Nor
is it a mere moving indication against a scale. The
progression of images, importantly, concerns the actual
picture detail in the control object or icon. This gives
the images an important advantage in the eyecatching
10 manner with which the images are presented. This
significantly enhances the ability of the user to
perceive the control objects or icons and so identify the
options which are represented.

15 The progression shown in Figure 4 is of a control object
or icon which is made to appear with progressively
increasing picture detail. This will be referred to as a
forward animation. The images in Figure 4 can however be
animated so that the first image in the progression
20 begins with the image 40i, proceeds through the
intermediate images 40h, 40g, 40f, 40e, 40d, 40c and 40b
in that order and concludes with the image 40a. Such an
animation makes the picture detail of the control object
or icon shrink from the display screen. An animation in
25 this direction will be referred to as a reverse
animation.

The forward and reverse animations are generated by means
of animation program modules which are called up by the
30 application program and are shown as linked to the
application program in the diagram of Figure 2. The

modules provide image formats which may be bitmap formats or digital video formats.

Control of the execution of the application program is
5 linked with the execution of the animations and will now
be described with reference to Figure 3. In step 20 the
application program causes the system to initiate a
request for an input from the user. Such a request may be
for a single input such as a PIN number or may be a
10 request to make a selection from a menu of options. In
step 21, the application program calls for the relevant
animation module. Control is passed to the requested
animation module to run a forward animation sequence so
as to make the picture detail of one or more control
15 objects or icons appear to grow on the display screen. In
step 22, the last image in the animation is put onto the
screen and in step 23 control is passed back to the
application program. The user is now able to make an
entry through the control object or a selected one of a
20 group of the objects on the screen.

In step 24 the application program checks whether the
user has made an entry. Once a user selected object is
identified, the control objects or icons on the screen
25 are disabled in step 25 so as to prevent a mistaken
double entry. In step 26 the application program calls up
an animation module to run a reverse animation for the
displayed control object or objects. Once the last image
in the reverse animation is reached in step 27, the
30 control is passed back to the application program once
more so as to move on to the next request for user entry.

CLAIMS

1. A method of operating a data processing system
5 including a data processor, a display device
incorporating a display screen, a display device driver,
user entry means and programming means to control the
data processing apparatus, the method comprising the
steps of operating the display device driver to depict a
10 control object defining a data processing operation, and
controlling the system through the user entry means to
perform the operation defined by the control object, the
depiction of the control object comprising a forward
succession of images in which the amount of picture
15 detail of the depiction is increased progressively
through the succession of images.
2. A method as claimed in claim 1, comprising the
further step of operating the display device to display a
20 reverse succession of images depicting the control object
in which the amount of picture detail of the depiction is
decreased progressively through the reverse succession of
image.
- 25 3. A method as claimed in claim 1, wherein the
depiction of the control object comprises a forward
succession of images which appears to the human eye to be
a continuously changing image without perceptible
discontinuities.
- 30 4. A method as claimed in claim 2, wherein the
depiction of the control object comprises forward and

reverse successions of images each of which appears to the human eye to be a continuously changing image without perceptible discontinuities.

5 5. A method as claimed in any one of the preceding claims in which the control object constitutes one of a group of such control objects, each object defining a different selectively operable data processing operation.

10 6. A method as claimed in any one of the preceding claims applied to controlling the operation of a data processing system which constitutes an automated teller machine.

15 7. Data processing apparatus including a data processor, a display device incorporating a display screen, a display device driver, user entry means and programming means to control the data processing apparatus, the programming means being adapted to operate
20 the display device driver to depict a control object defining a data processing operation, the entry means being operable by the user to cause the system to perform the operation defined by the control object, the depiction of the control object comprising a forward
25 succession of images in which the amount of picture detail of the depiction is increased progressively through the succession of images.

8. Apparatus as claimed in claim 7, wherein the
30 programming means is further adapted to operate the display device to display a reverse succession of images depicting the control object in which the amount of

picture detail of the depiction is decreased progressively through the reverse succession of image.

9. Apparatus as claimed in claim 7, wherein the depiction of the control object comprises a forward succession of images which appears to the human eye to be a continuously changing image without perceptible discontinuities.

10. Apparatus as claimed in claim 8, wherein the depiction of the control object comprises forward and reverse successions of images each of which appears to the human eye to be a continuously changing image without perceptible discontinuities.

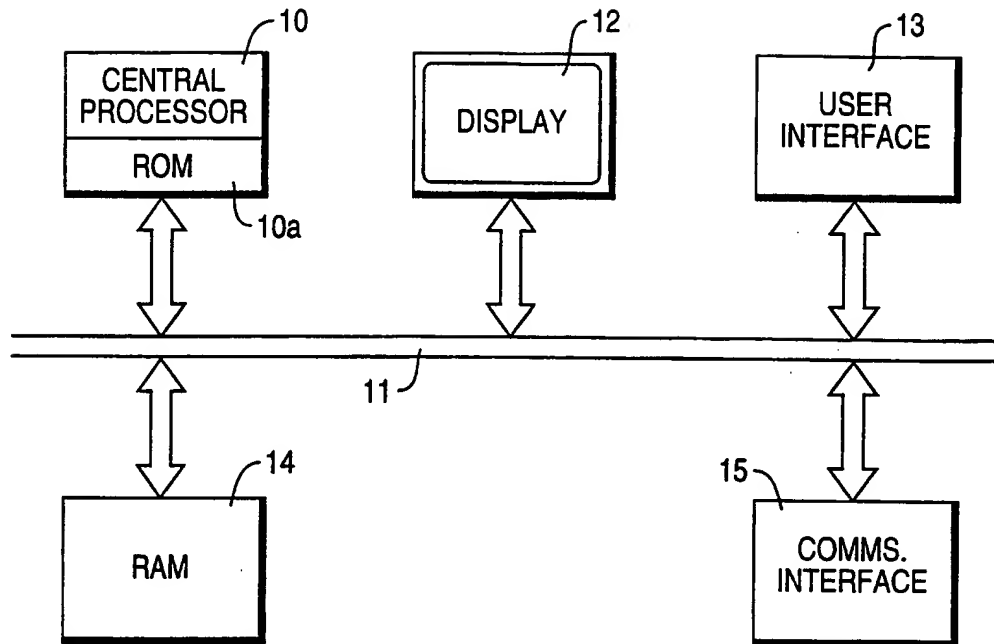
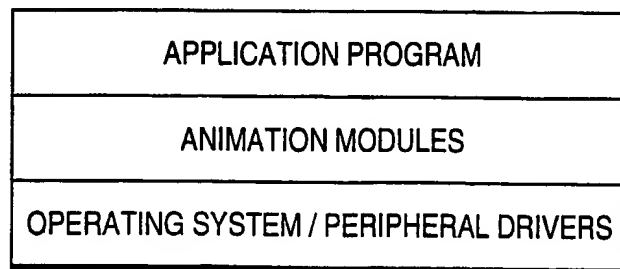
11. Apparatus as claimed in any one of claims 7 to 10, in which the control object constitutes one of a group of such control objects, each object defining a different selectively operable data processing operation.

12. Apparatus as claimed in any one of claims 7 to 11 which constitutes an automated teller machine.

13. A method of operating a data processing system including a data processor, a display device incorporating a display screen, a display device driver, user entry means and programming means to control the data processing apparatus, the method being substantially as hereinbefore described with reference to Figures 1, 2 and 3 of the accompanying drawings.

14. Data processing apparatus including a data processor, a display device incorporating a display screen, a display device driver, user entry means and programming means to control the data processing
- 5 apparatus, the apparatus being substantially as hereinbefore described with reference to Figures 1, 2 and 3 of the accompanying drawings.

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FIG. 1**FIG. 2**

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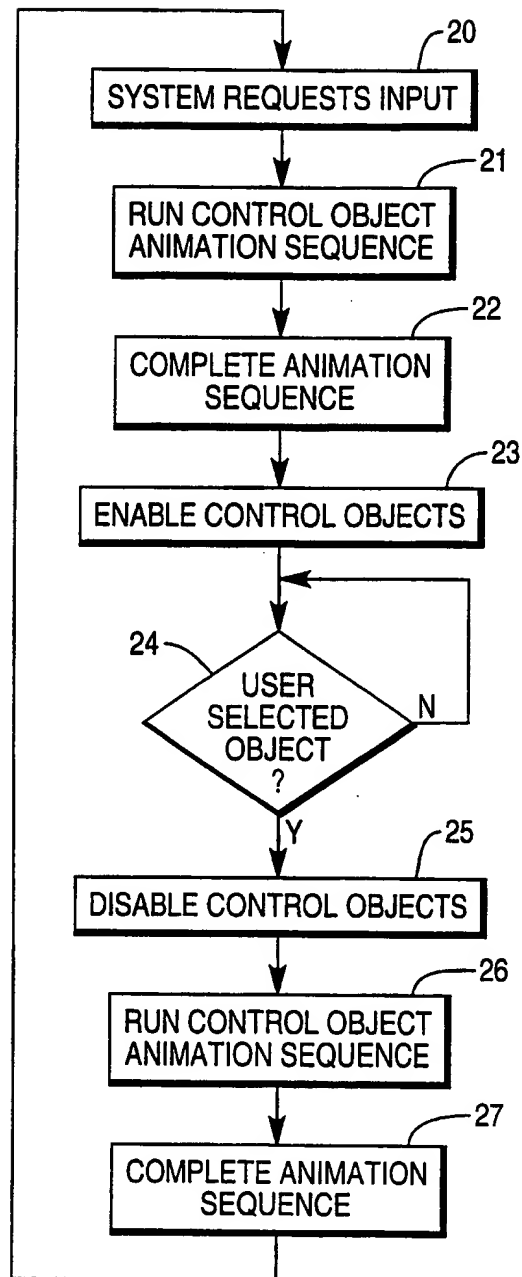
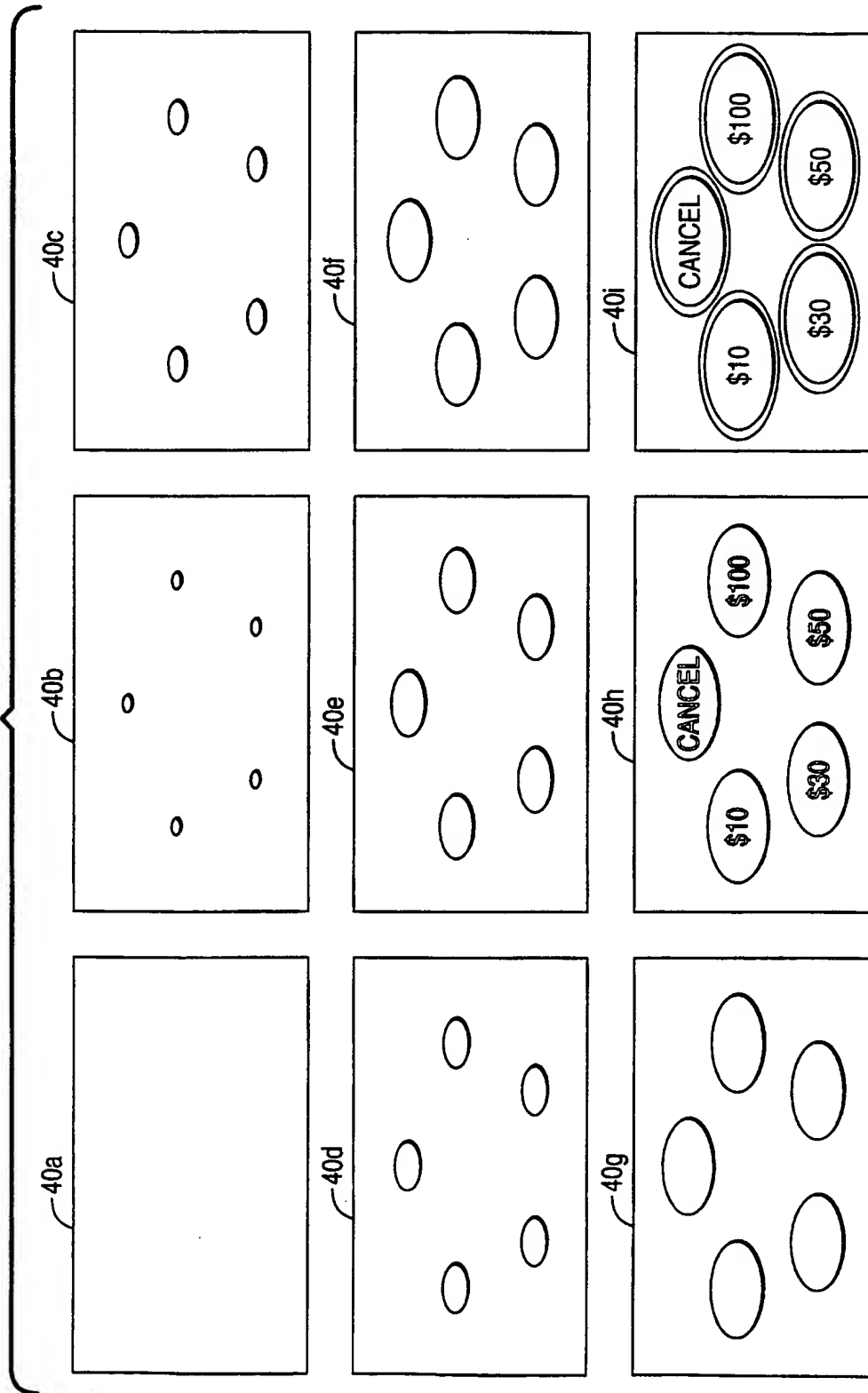
FIG. 3

FIG. 4



INTERNATIONAL SEARCH REPORT

International Application No

PCT/GB 99/03685

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 G06F3/033 G07F19/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC 7 G06F G07F

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	EP 0 483 777 A (HEWLETT PACKARD CO) 6 May 1992 (1992-05-06) column 17, line 10 -column 18, line 18; figures 11,12 ---	1-12
X	US 5 237 651 A (RANDALL STEPHEN) 17 August 1993 (1993-08-17) column 6, last paragraph -column 7, line 31; figures 3-4C ---	1-12
X	PATENT ABSTRACTS OF JAPAN vol. 1995, no. 10, 30 November 1995 (1995-11-30) & JP 07 193890 A (TOA CORP), 28 July 1995 (1995-07-28) abstract --- -/-	1,3,5-7, 9,11,12

☒ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

* Special categories of cited documents:

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X document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search

28 January 2000

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INTERNATIONAL SEARCH REPORT

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C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	<p>"VISUALLY AGING ICONS"</p> <p>IBM TECHNICAL DISCLOSURE BULLETIN,US,IBM CORP. NEW YORK, vol. 38, no. 2, 1 February 1995 (1995-02-01), page 235 XP000502456 ISSN: 0018-8689 the whole document</p> <p>----</p>	<p>1,3,5,7, 9,11</p>
A	<p>EP 0 677 803 A (IBM) 18 October 1995 (1995-10-18) column 13, line 31 -column 14, line 21; figure 10</p> <p>-----</p>	<p>1-12</p>

INTERNATIONAL SEARCH REPORT

International application No.
PCT/GB 99/03685

Box I Observations where certain claims were found unsearchable (Continuation of item 1 of first sheet)

This International Search Report has not been established in respect of certain claims under Article 17(2)(a) for the following reasons:

1. ☐ Claims Nos.:
because they relate to subject matter not required to be searched by this Authority, namely:
2. ☒ Claims Nos.: 13, 14
because they relate to parts of the International Application that do not comply with the prescribed requirements to such an extent that no meaningful International Search can be carried out, specifically:
Claims 13 and 14 are unclear. The definition of the matter for which protection is sought is not in terms of technical features, Art.6 and Rule 6.3(a) .
3. ☐ Claims Nos.:
because they are dependent claims and are not drafted in accordance with the second and third sentences of Rule 6.4(a).

Box II Observations where unity of invention is lacking (Continuation of item 2 of first sheet)

This International Searching Authority found multiple inventions in this international application, as follows:

1. ☐ As all required additional search fees were timely paid by the applicant, this International Search Report covers all searchable claims.
2. ☐ As all searchable claims could be searched without effort justifying an additional fee, this Authority did not invite payment of any additional fee.
3. ☐ As only some of the required additional search fees were timely paid by the applicant, this International Search Report covers only those claims for which fees were paid, specifically claims Nos.:
4. ☐ No required additional search fees were timely paid by the applicant. Consequently, this International Search Report is restricted to the invention first mentioned in the claims; it is covered by claims Nos.:

Remark on Protest

- ☐ The additional search fees were accompanied by the applicant's protest.
- ☐ No protest accompanied the payment of additional search fees.

FURTHER INFORMATION CONTINUED FROM PCT/ISA/ 210

Continuation of Box I.2

Claims Nos.: 13,14

Claims 13 and 14 are unclear. The definition of the matter for which protection is sought is not in terms of technical features, Art.6 and Rule 6.3(a) .

The applicant's attention is drawn to the fact that claims, or parts of claims, relating to inventions in respect of which no international search report has been established need not be the subject of an international preliminary examination (Rule 66.1(e) PCT). The applicant is advised that the EPO policy when acting as an International Preliminary Examining Authority is normally not to carry out a preliminary examination on matter which has not been searched. This is the case irrespective of whether or not the claims are amended following receipt of the search report or during any Chapter II procedure.

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No

PCT/GB 99/03685

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